Texas CTE

Pathophysiology (2014)

The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to: 1

A demonstrate safe practices during laboratory and field investigations 1.A

1 demonstrate safe practices during laboratory investigations 1.A.1

2 demonstrate safe practices during field investigations 1.A.2

B demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials 1.B

1 demonstrate an understanding of the use of resources 1.B.1

2 demonstrate an understanding of the conservation of resources 1.B.2

3 demonstrate an understanding of the proper disposal or recycling of materials 1.B.3

The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to: 2

A know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section 2.A

B know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories 2.B

1 know that hypotheses are tentative statements that must be capable of being supported or not supported by observational evidence 2.B.1

2 know that hypotheses are testable statements that must be capable of being supported or not supported by observational evidence 2.B.2

3 [know that] Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories 2.B.3

C **know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed** 2.C

1 know scientific theories are based on natural phenomena 2.C.1

2 know scientific theories are based on physical phenomena 2.C.2

3 know scientific theories are capable of being tested by multiple independent researchers 2.C.3

4 [know that] Unlike hypotheses, scientific theories are well-established and highlyreliable explanations, but they may be subject to change as new areas of science and new technologies are developed 2.C.4

D **distinguish between scientific hypotheses and scientific theories** 2.D

E **plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology** 2.E

1 plan descriptive investigations, including asking questions 2.E.1

2 plan descriptive investigations, including formulating testable hypotheses 2.E.2

3 plan descriptive investigations, including selecting equipment 2.E.3

4 plan descriptive investigations, including selecting technology 2.E.4

5 implement descriptive investigations, including asking questions 2.E.5

6 implement descriptive investigations, including formulating testable hypotheses 2.E.6

7 implement descriptive investigations, including selecting equipment 2.E.7

8 implement descriptive investigations, including selecting technology 2.E.8

9 plan comparative investigations, including asking questions 2.E.9

10 plan comparative investigations, including formulating testable hypotheses 2.E.10

11 plan comparative investigations, including selecting equipment 2.E.11

12 plan comparative investigations, including selecting technology 2.E.12

13 implement comparative investigations, including asking questions 2.E.13

14 implement comparative investigations, including formulating testable hypotheses 2.E.14

15 implement comparative investigations, including selecting equipment 2.E.15

16 implement comparative investigations, including selecting technology 2.E.16

17 plan experimental investigations, including asking questions 2.E.17

18 plan experimental investigations, including formulating testable hypotheses 2.E.18

19 plan experimental investigations, including selecting equipment 2.E.19

20 plan experimental investigations, including selecting technology 2.E.20

21 implement experimental investigations, including asking questions 2.E.21

22 implement experimental investigations, including formulating testable hypotheses 2.E.22

23 implement experimental investigations, including selecting equipment 2.E.23

24 implement experimental investigations, including selecting technology 2.E.24

F **collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, gel electrophoresis apparatuses, micropipettors, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, cameras, Petri dishes, lab incubators, meter sticks, and models, diagrams, or samples of biological specimens or structures** 2.F

1. collect qualitative data using tools 2.F.1
2. collect quantitative data using tools 2.F.2
3. organize qualitative data using tools 2.F.3
4. organize quantitative data using tools 2.F.4
5. make measurements with accuracy using tools 2.F.5
6. make measurements with precision using tools 2.F.6

G **analyze, evaluate, make inferences, and predict trends from data** 2.G

1. analyze data 2.G.1
2. evaluate data 2.G.2
3. make inferences from data 2.G.3
4. predict trends from data 2.G.4

H **communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports** 2.H

1. communicate valid conclusions supported by the data through methods 2.H.1

The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to: 3

A in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student 3.A

1 in all fields of science, analyze scientific explanations by using empirical evidence, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student 3.A.1

2 in all fields of science, analyze scientific explanations by using logical reasoning, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student 3.A.2

3 in all fields of science, analyze scientific explanations by using experimental testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student 3.A.3

4 in all fields of science, analyze scientific explanations by using observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student 3.A.4

5 in all fields of science, evaluate scientific explanations by using empirical evidence, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student 3.A.5

6 in all fields of science, evaluate scientific explanations by using logical reasoning, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student 3.A.6

7 in all fields of science, evaluate scientific explanations by using experimental testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student 3.A.7

8 in all fields of science, evaluate scientific explanations by using observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student 3.A.8

9 in all fields of science, critique scientific explanations by using empirical evidence, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student 3.A.9

10 in all fields of science, critique scientific explanations by using logical reasoning, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student 3.A.10

11 in all fields of science, critique scientific explanations by using experimental testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student 3.A.11

12 in all fields of science, critique scientific explanations by using observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student 3.A.12

B communicate and apply scientific information extracted from various sources such as current events, news reports published journal articles, and marketing materials 3.B

1 communicate scientific information extracted from various sources 3.B.1

2 apply scientific information extracted from various sources 3.B.2

C draw inferences based on data related to promotional materials for products and services 3.C

1 draw inferences based on data related to promotional materials for products 3.C.1

2 draw inferences based on data related to promotional materials for services 3.C.2

D evaluate the impact of scientific research on society and the environment 3.D

1 evaluate the impact of scientific research on society 3.D.1

2 evaluate the impact of scientific research on the environment 3.D.2

E evaluate models according to their limitations in representing biological objects or events 3.E

F research and describe the history of science and contributions of scientists 3.F

1 research the history of science 3.F.1

2 research the contributions of scientists 3.F.2

3 describe the history of science 3.F.3

4 describe the contributions of scientists 3.F.4

The student analyzes the mechanisms of pathology. The student is expected to: 4

A identify biological and chemical processes at the cellular level 4.A

1 identify biological processes at the cellular level 4.A.1

2 identify chemical processes at the cellular level 4.A.2

B detect changes resulting from mutations and neoplasms by examining cells, tissues, organs, and systems 4.B

1 detect changes resulting from mutations by examining cells 4.B.1

2 detect changes resulting from mutations by examining tissues 4.B.2

3 detect changes resulting from mutations by examining organs 4.B.3

4 detect changes resulting from mutations by examining systems 4.B.4

5 detect changes resulting from neoplasms by examining cells 4.B.5

6 detect changes resulting from neoplasms by examining tissues 4.B.6

7 detect changes resulting from neoplasms by examining organs 4.B.7

8 detect changes resulting from neoplasms by examining systems 4.B.8

C **identify factors that contribute to disease such as age, gender, environment, lifestyle, and heredity** 4.C

1 identify factors that contribute to disease 4.C.1

D **examine the body's compensating mechanisms occurring under various conditions** 4.D

E **analyze how the body attempts to maintain homeostasis when changes occur** 4.E

The student examines the process of pathogenesis. The student is expected to: 5

A **identify pathogenic organisms using microbiological techniques** 5.A

B **differentiate the stages of pathogenesis, including incubation period, prodromal period, and exacerbation or remission** 5.B

1 differentiate the stages of pathogenesis, including incubation period 5.B.1

2 differentiate the stages of pathogenesis, including prodromal period 5.B.2

3 differentiate the stages of pathogenesis, including exacerbation or remission 5.B.3

C **analyze the body's natural defense systems against infection such as barriers, the inflammatory response, and the immune response** 5.C

1 analyze the body's natural defense systems against infection 5.C.1

D **evaluate the effects of chemical agents, environmental pollution, and trauma on the disease process** 5.D

1 evaluate the effects of chemical agents on the disease process 5.D.1

2 evaluate the effects of environmental pollution on the disease process 5.D.2

3 evaluate the effects of trauma on the disease process 5.D.3

The student examines a variety of human diseases. The student is expected to: 6

A **describe on the nature of diseases according to etiology, signs and symptoms, diagnosis, prognosis, and treatment options** 6.A

1 describe on the nature of diseases according to etiology 6.A.1

2 describe on the nature of diseases according to signs 6.A.2

3 describe on the nature of diseases according to symptoms 6.A.3

4 describe on the nature of diseases according to diagnosis 6.A.4

5 describe on the nature of diseases according to prognosis 6.A.5

6 describe on the nature of diseases according to treatment options 6.A.6

B **explore advanced technologies for the diagnosis and treatment of disease** 6.B

1 explore advanced technologies for the diagnosis of disease 6.B.1

2 explore advanced technologies for the treatment of disease 6.B.2

C examine reemergence of diseases such as malaria, tuberculosis, and polio 6.C

1 examine reemergence of diseases 6.C.1

D describe drug-resistant diseases 6.D

E differentiate between congenital disorders and childhood diseases 6.E

F investigate ways diseases affect multiple body systems 6.F

The student integrates the effects of disease prevention and control. The student is expected to: 7

A evaluate public health issues related to asepsis, isolation, immunization, and quarantine 7.A

1 evaluate public health issues related to asepsis 7.A.1

2 evaluate public health issues related to isolation 7.A.2

3 evaluate public health issues related to immunization 7.A.3

4 evaluate public health issues related to quarantine 7.A.4

B analyze the effects of stress and aging on the body 7.B

1 analyze the effects of stress on the body 7.B.1

2 analyze the effects of aging on the body 7.B.2

C evaluate treatment options for diseases 7.C

D investigate diseases that threaten world health and propose intervention strategies 7.D

1 investigate diseases that threaten world health 7.D.1

2 propose intervention strategies [for diseases] 7.D.2

E develop a plan for personal health and wellness 7.E

1 develop a plan for personal health 7.E.1

2 develop a plan for personal wellness 7.E.2